<u>We claim</u>:

1. A method of determining an uncoded bit error rate p_b based on a target symbol error rate ε_s, comprising:

determining the uncoded bit error rate p_b based on a weighted series expansion of the target symbol error rate ε_s, comprising weights W that are a function of a maximum number of symbol errors that can be corrected t and a number of symbols in an information field K; and

selecting the maximum number of symbol errors t and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate ε_s is largest.

2. The method of claim 1 wherein the weighted series expansion comprises at least a first term, wherein second order and higher terms are ignored to determine the uncoded bit error rate p_b.

3. The method of claim 1 wherein the symbols comprise Reed-Solomon symbols.

4. The method of claim 1 wherein the weighted series expansion to determine the uncoded bit error p_b rate comprises the following relationship:

$$p_b = 1 - \left(1 - W(t,K)\,\varepsilon_S^{\frac{1}{(t+1)}}\right)^{1/\alpha}$$

wherein

$$W(t,K)=\left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}},$$

ε_s represents a target symbol error rate, and C + R represents a number of symbols in an error correction field.

5. A method of determining an optimum bit load per subchannel in a multicarrier system with forward error correction, comprising:

computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the optimum bit load per subchannel in accordance with the following relationship:

$$1-\left(1-W(t,K)\varepsilon_S^{\frac{1}{t+1}}\right)^{1/\alpha}=\omega(b)\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)$$
$$\times\left[2-\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\right]$$

wherein $W(t,K)=\left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}}$,

$$\omega(b)=\frac{1}{b\cdot 2^b}\sum_{i=1}^{2^b}\sum_{j\neq i}^{2^b}\frac{d_H\left(a_i,a_j\right)}{\chi_i},$$

ε_s represents a target symbol error rate, C + R represents a number of symbols in an error correction field, *b* represents a number of bit positions of a quadrature-amplitude-modulation symbol, *ω(b)* represents an average fraction of erroneous bits in an erroneous *b*-sized quadrature-amplitude-modulation symbol, a_i represents a label for the i^{th} point of a constellation associated with a subchannel, a_j

represents a label for the j^{th} point of a constellation associated with a subchannel, χ_i represents a coordination number of the a_i^{th} point, $d_H(a_i, a_j)$ represents a Hamming distance between respective binary vectors associated with points a_i and a_j ; and

selecting the maximum number of symbol errors that can be corrected t, and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate is increased.

6. A method of determining an optimum bit load per subchannel in a multicarrier system with forward error correction, comprising:

computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the optimum bit load per subchannel in accordance with the following relationship:

$$1-\left(1-W(t,K)\varepsilon_S^{\frac{1}{t+1}}\right)^{1/\alpha}=\omega(b)\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\times\left[2-\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\right],$$

$$\text{wherein } W(t,K)=\left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}},$$

ε_s represents a target symbol error rate, C + R represents a number of symbols in an error correction field, b represents a number of bit positions of a quadrature-amplitude-modulation symbol, $\omega(b)$ represents an approximate average fraction of erroneous bits in an erroneous b-sized quadrature-amplitude-modulation symbol; and

selecting the maximum number of symbol errors that can be corrected t, and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate is increased.

7. The method of claim 6 wherein $\omega(b_i)$ is determined in accordance with the following relationship:

$$\omega(b_i) = \frac{4}{3+2b_i}$$

8. A method of selecting forward error correction parameters in a channel having a plurality of subchannels in a multicarrier communications system, comprising:

determining a signal-to-noise ratio representing a subset of the subchannels; and

selecting forward error correction parameters of the channel based on the signal-to-noise ratio.

9. The method of claim 8 wherein the subset of the subchannels comprises all of the subchannels of the channel.

10. The method of claim 8 wherein the forward error correction parameters are utilized in Reed- Solomon encoding.

11. The method of claim 8 wherein the signal-to-noise ratio is an average signal-to-noise ratio of respective signal-to-noise ratios of the subset of the subchannels.

12. The method of claim 8 wherein the signal-to-noise ratio represents all of the subchannels.

13. The method of claim 8 wherein the selecting comprises applying a mean field approximation to evaluate a bit load over the subset of subchannels.

14. The method of claim 13 wherein the selecting comprises adjusting the mean field approximation.

15. The method of claim 14 wherein the adjusting is applied when the number of bits per subchannel is less than or equal to two.

16. The method of claim 14 wherein the adjusting is a linear adjustment with respect to a bit load of a subchannel.

17. The method of claim 8 further comprising:
determining the representative performance measurement as an average signal-to-noise ratio γ_{eff} for the channel in accordance with the following relationship:

$$\gamma_{eff} = \frac{1}{n_{eff}} \sum_{\gamma_i > \gamma_*} \gamma_i \text{, wherein}$$

$$n_{eff} = \sum_{\gamma_i > \gamma_*} 1,$$

γ_i represents a signal-to-noise measurement for an ith subchannel, and n_{eff} represents a number of subchannels for which the signal-to-noise ratio γ_i was

measured for which γ_i is greater than γ_*, and γ_* represents a threshold signal-to-noise ratio.

18. A method of determining a bit load b per subchannel in a multicarrier system with forward error correction, comprising:

computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the bit load per subchannel in accordance with the following relationship:

$$b = [\gamma + \Phi(\gamma, t, K, \varepsilon)] / 10 \log 2 ,$$

wherein

$$\Phi(\gamma, t, K, \varepsilon) = 10 \log \left\{ 10^{-\gamma/10} + \frac{3 \log e}{2 \log \left[\frac{\alpha \langle \omega(b) \rangle \sqrt{8/\pi}}{W(t,K)(\alpha\varepsilon/\beta)^{\frac{1}{(t+1)}}} \right] - \log \log \left[\frac{\alpha \langle \omega(b) \rangle \sqrt{8/\pi}}{W(t,K)(\alpha\varepsilon/\beta)^{\frac{1}{(t+1)}}} \right] + \log \left(\frac{\log e}{2} \right)} \right\}$$

,

$$W(t,K) = \left[\binom{K+C+R-1}{t} \right]^{-\frac{1}{(t+1)}} \left[\binom{K+C+R}{t+1} \right]^{-\frac{k-1}{(t+1)}} ,$$

$$\langle \omega(b) \rangle = \frac{1}{b_{max}} \int_1^{b_{max}} \omega(b)\left(1 - 2^{-b/2}\right) db$$

α represents a number of bits per symbol, γ represents a signal-to-noise ratio, t represents a maximum number of symbol errors that can be corrected, ε represents a target bit error rate, C + R represents a number of symbols in an error correction field,

b represents a number of bit positions of a quadrature-amplitude-modulation symbol, $\omega(b)$ represents an average fraction of erroneous bits in an erroneous *b*-sized quadrature-amplitude-modulation symbol, b_{max} is a maximum bit load per subchannel; and

selecting a bit load per subchannel in accordance with the maximum number of symbol errors that can be corrected *t*, and a number of symbols in the information field *K*.

19. The method of claim 18 wherein $\Phi(\gamma, t, K, \varepsilon)$ is evaluated at γ equals $-\infty$.

20. The method of claim 18 wherein b is greater than or equal to three.

21. A method of selecting forward error correction parameters for use in a channel having a plurality of subchannels, comprising:

determining an average signal-to-noise ratio of at least a subset of the subchannels; and

selecting forward error correction parameters based on the average signal-to-noise ratio, and a count of the number of subchannels in the subset.

22. The method of claim 21 wherein the selecting the forward error correction parameters comprises selecting the forward error correction parameters based on a predicted gain from application of the selected forward error correction parameters.

23. The method of claim 22 wherein the gain is a performance gain.

24. A method of selecting at least one forward error correction parameter, comprising:

computing one or more values representing a number of information symbols K in a frame accordance with the following relationship:

$$\left[\frac{\alpha(K+s+zs)}{s\,n_{eff}}+1.5\right]\left[1-\left(1-\left(\left[\binom{K+C+R-1}{t}\right]^{-\frac{1}{(t+1)}}\varepsilon_S^{1/(t+1)}\right)\right)^{1/\alpha}\right]$$

$$=2\left(1-2^{-\frac{\alpha(K+s+zs)}{2sn_{eff}}}\right)erfc\left(\sqrt{1.5\cdot 10^{\gamma_{eff}/10}\Big/\left(2^{\frac{\alpha(K+s+zs)}{sn_{eff}}}-1\right)}\right)$$

$$\times\left[2-\left(1-2^{-\frac{\alpha(K+s+zs)}{2sn_{eff}}}\right)erfc\left(\sqrt{1.5\cdot 10^{\gamma_{eff}/10}\Big/\left(2^{\frac{\alpha(K+s+zs)}{sn_{eff}}}-1\right)}\right)\right]$$

wherein $t=\left\lfloor\frac{sz+1+e_r}{2}\right\rfloor$, $e_r \leq sz$, and

s represents a number of discrete multi-tone symbols in a frame, z represents a number of error correction symbols in a discrete multi-tone symbol, α represents a number of bits per code symbol, C+R represents a number of redundant symbols in an error correction field, n_{eff} represents a number of subchannels exceeding a threshold performance value, γ_{eff} represents an effective signal-to-noise ratio associated with the number of subchannels exceeding the threshold performance value, ε_s represents a target symbol error rate; and e_r represents a number of erasures; and

determining a number of bits per subchannel in accordance with the one or more values of K.

25. The method of claim 24 wherein K is a continuous variable.

26. The method of claim 24 wherein K is computed using dichotomy, for values of γ_{eff}, n_{eff}, z, and s.

27. The method of claim 24 further comprising:

determining a net coding gain associated with values of γ_{eff}, n_{eff}, z, and s;

determining an incremental number of bits per subchannel associated with the net coding gain; and

storing associated values of γ_{eff}, n_{eff}, z, s and the incremental number of bits per subchannel.

28. A method of selecting transmission parameters of a multicarrier system having a channel comprising a plurality of subchannels, comprising:

selecting a number (s) of discrete multi-tone symbols in a forward-error-correction frame, and a number (z) of forward-error-correction control symbols in a discrete multitone symbol based on a signal-to-noise ratio and a number of subchannels associated with the signal-to-noise ratio; and

transmitting information in accordance with the selected number (s) of discrete multi-tone symbols, and a number (z) of forward-error-correction control symbols in the discrete multitone symbol.

29. The method of claim 28 wherein the selecting comprises selecting an adjustment value per subchannel based on the signal-to-noise ratio and the number of subchannels associated with the signal-to-noise ratio; and

adjusting a number of bits per subchannel for at least one subchannel in accordance with the adjustment value.

30. The method of claim 28 wherein the signal-to-noise ratio is an average signal-to-noise ratio of the associated number of subchannels.

31. The method of claim 28 further comprising:

storing, in a table, the number (s) of discrete multi-tone symbols in the forward-error-correction frame, the number (z) of forward-error-correction control symbols in the discrete multitone symbol associated with the signal-to-noise ratio and the number of subchannels associated with the signal-to-noise ratio, for different values of s, z, signal-to-noise ratios and numbers of subchannels.

32. The method of claim 31 wherein for each value of signal-to-noise ratio and number of bits per subchannel of the table, the associated value of s and z provide a maximal net coding gain g_n, and the associated value of s and z is selected from a subset of associated s and z values.

33. An apparatus for determining an uncoded bit error rate p_b based on a target symbol error rate ε_s, comprising:

means for determining the uncoded bit error rate p_b based on a weighted series expansion of the target symbol error rate ε_s, comprising weights W that are a function of a maximum number of symbol errors that can be corrected t and a number of symbols in an information field K; and

means for selecting the maximum number of symbol errors t and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate ε_s is largest.

34. The apparatus of claim 33 wherein the weighted series expansion comprises at least a first term, wherein second order and higher terms are ignored to determine the uncoded bit error rate p_b.

35. The apparatus of claim 33 wherein the symbols comprise Reed-Solomon symbols.

36. The apparatus of claim 33 wherein the weighted series expansion to determine the uncoded bit error p_b rate comprises the following relationship:

$$p_b = 1-\left(1-W(t,K)\varepsilon_S^{\frac{1}{(t+1)}}\right)^{1/\alpha}$$

wherein

$$W(t,K) = \left[\binom{K+C+R-1}{t}\right]^{-\frac{1}{(t+1)}},$$

ε_s represents a target symbol error rate, and C + R represents a number of symbols in an error correction field.

37. An apparatus for determining an optimum bit load per subchannel in a multicarrier system with forward error correction, comprising:

means for computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the optimum bit load per subchannel in accordance with the following relationship:

$$\begin{aligned}1-\left(1-W(t,K)\varepsilon_S^{\frac{1}{t+1}}\right)^{1/\alpha} &= \omega(b_i)\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\\ &\times\left[2-\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\right]\end{aligned}$$

$$\text{wherein } W(t,K) = \left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}},$$

$$\omega(b) = \frac{1}{b \cdot 2^b} \sum_{i=1}^{2^b} \sum_{j \neq i}^{\chi_i} \frac{d_H(a_i, a_j)}{\chi_i},$$

ε_s represents a target symbol error rate, C + R represents a number of symbols in an error correction field, b represents a number of bit positions of a quadrature-amplitude-modulation symbol, $\omega(b)$ represents an average fraction of erroneous bits in an erroneous b-sized quadrature-amplitude-modulation symbol, a_i represents a label for the i^{th} point of a constellation associated with a subchannel, a_j represents a label for the j^{th} point of a constellation associated with a subchannel, χ_i represents a coordination number of the a_i^{th} point, $d_H(a_i, a_j)$ represents a Hamming distance between respective binary vectors associated with points a_i and a_j ; and

means for selecting the maximum number of symbol errors that can be corrected t, and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate is increased.

38. An apparatus for determining an optimum bit load per subchannel in a multicarrier system with forward error correction, comprising:

means for computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the optimum bit load per subchannel in accordance with the following relationship:

$$1-\left(1-W(t,K)\varepsilon_S^{\frac{1}{t+1}}\right)^{1/\alpha}=\omega(b\ )\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)$$
$$\times\left[2-\left(1-2^{-b_i(t,K)/2}\right)erfc\left(\sqrt{3\cdot 10^{\gamma_i/10}/\left(2^{b_i(t,K)+1}-2\right)}\right)\right],$$

$$\text{wherein } W(t,K)=\left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}},$$

ε_s represents a target symbol error rate, C + R represents a number of symbols in an error correction field, b represents a number of bit positions of a quadrature-amplitude-modulation symbol, $\omega(b)$ represents an approximate average fraction of erroneous bits in an erroneous b-sized quadrature-amplitude-modulation symbol; and

selecting the maximum number of symbol errors that can be corrected t, and the number of symbols in the information field K such that the uncoded bit error rate p_b that produces a symbol error rate that is less than or equal to the target symbol error rate is increased.

39. The apparatus of claim 38 wherein $\omega(b_i)$ is determined in accordance with the following relationship:

$$\omega(b_i)=\frac{4}{3+2b_i}.$$

40. An apparatus for selecting forward error correction parameters in a channel having a plurality of subchannels in a multicarrier communications system, comprising:

means for determining a signal-to-noise ratio representing a subset of the subchannels; and

means for selecting forward error correction parameters of the channel based on the signal-to-noise ratio.

41. The apparatus of claim 40 wherein the subset of the subchannels comprises all of the subchannels of the channel.

42. The apparatus of claim 40 wherein the forward error correction parameters are utilized in Reed-Solomon encoding.

43. The apparatus of claim 40 wherein the signal-to-noise ratio is an average signal-to-noise ratio of respective signal-to-noise ratios of the subset of the subchannels.

44. The apparatus of claim 40 further comprising:

means for determining a signal-to-noise ratio representing all of the subchannels.

45. The apparatus of claim 40 wherein the means for selecting comprises means for applying a mean field approximation to evaluate a bit load over the subset of subchannels.

46. The apparatus of claim 40 wherein the means for selecting comprises means for adjusting the mean field approximation.

47. The apparatus of claim 46 wherein the means for adjusting is applied when the number of bits per subchannel is less than or equal to two.

48. The apparatus of claim 46 wherein the means for adjusting is a linear adjustment with respect to a bit load of a subchannel.

49. The apparatus of claim 46 further comprising:

means for determining the representative performance measurement as an average signal-to-noise ratio γ_{eff} for the channel in accordance with the following relationship:

$$\gamma_{eff} = \frac{1}{n_{eff}} \sum_{\gamma_i > \gamma_*} \gamma_i \text{, wherein}$$

$$n_{eff} = \sum_{\gamma_i > \gamma_*} 1,$$

γ_i represents a signal-to-noise ratio measurement for an ith subchannel, and n_{eff} represents a number of subchannels for which the signal-to-noise ratio γ_i was measured for which γ_i is greater than γ_*, and γ_* represents a threshold signal-to-noise ratio.

50. The apparatus of claim 49 further comprising:

means for determining the representative performance measurement as an average signal-to-noise ratio γ_{eff} for the channel in accordance with the following relationship:

$$\gamma_{eff} = \frac{1}{n_{eff}} \sum_{\gamma_i > \gamma_*} \gamma_i \text{, wherein}$$

$$n_{eff} = \sum_{\gamma_i \geq \gamma_*} 1,$$

γ_i represents a signal-to-noise measurement for an ith subchannel, and n_{eff} represents a number of subchannels for which the signal-to-noise ratio γ_i was measured for which γ_i is greater than or equal to than γ_*, and γ_* represents a threshold signal-to-noise ratio.

51. An apparatus for determining a bit load b per subchannel in a multicarrier system with forward error correction, comprising:

means for computing one or more values of a maximum number of symbol errors that can be corrected t, and a number of symbols in the information field K to determine the bit load per subchannel in accordance with the following relationship:

$$b = [\gamma + \Phi(\gamma, t, K, \varepsilon)]/10\log 2 \ ,$$

wherein

$$\Phi(\gamma,t,K,\varepsilon) = 10\log\left\{10^{-\gamma/10} + \frac{3\log e}{2\log\left[\frac{\alpha\langle\omega(b)\rangle\sqrt{8/\pi}}{W(t,K)(\alpha\varepsilon/\beta)^{\frac{1}{(t+1)}}}\right] - \log\log\left[\frac{\alpha\langle\omega(b)\rangle\sqrt{8/\pi}}{W(t,K)(\alpha\varepsilon/\beta)^{\frac{1}{(t+1)}}}\right] + \log\left(\frac{\log e}{2}\right)}\right\}$$

,

$$W(t,K) = \left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}}\left[\binom{K+C+R}{t+1}\right]^{\frac{k-1}{(t+1)}} \quad ,$$

$$\langle \omega(b) \rangle = \frac{1}{b_{max}} \int_{1}^{b_{max}} \omega(b)\left(1-2^{-b/2}\right)db$$

α represents a number of bits per symbol, γ represents a signal-to-noise ratio, t represents a maximum number of symbol errors that can be corrected, ε represents a target bit error rate, C + R represents a number of symbols in an error correction field, *b* represents a number of bit positions of a quadrature-amplitude-modulation symbol, $\omega(b)$ represents an average fraction of erroneous bits in an erroneous *b*-sized quadrature-amplitude-modulation symbol, b_{max} is a maximum bit load per subchannel; and

means for selecting a bit load per subchannel in accordance with the maximum number of symbol errors that can be corrected *t*, and a number of symbols in the information field *K*.

52. The apparatus of claim 51 wherein $\Phi(\gamma, t, K, \varepsilon)$ is evaluated at γ equals $-\infty$.

53. The apparatus of claim 51 wherein b is greater than or equal to three.

54. An apparatus for selecting forward error correction parameters for use in a channel having a plurality of subchannels, comprising:

means for determining an average signal-to-noise ratio of at least a subset of the subchannels; and

means for selecting forward error correction parameters based on the average signal-to-noise ratio, and a count of the number of subchannels in the subset.

55. The apparatus of claim 54 wherein the means for selecting the forward error correction parameters selects the forward error correction parameters based on a predicted gain from application of the selected forward error correction parameters.

56. The apparatus of claim 55 wherein the gain is a performance gain.

57. An apparatus for selecting at least one forward error correction parameter, comprising:

means for computing one or more values representing a number of information symbols K in a frame accordance with the following relationship:

$$\left[\frac{\alpha(K+s+zs)}{s\,n_{eff}}+1.5\right]\left[1-\left(1-\left(\left[\binom{K+C+R-1}{t}\right]^{\frac{1}{(t+1)}}\varepsilon_S^{1/(t+1)}\right)\right)^{1/\alpha}\right]$$

$$=2\left(1-2^{\frac{\alpha(K+s+zs)}{2sn_{eff}}}\right)erfc\left(\sqrt{1.5\cdot 10^{\gamma_{eff}/10}/\left(2^{\frac{\alpha(K+s+zs)}{sn_{eff}}}-1\right)}\right)$$

$$\times\left[2-\left(1-2^{\frac{\alpha(K+s+zs)}{2sn_{eff}}}\right)erfc\left(\sqrt{1.5\cdot 10^{\gamma_{eff}/10}/\left(2^{\frac{\alpha(K+s+zs)}{sn_{eff}}}-1\right)}\right)\right]$$

wherein $t=\left\lfloor\frac{sz+1+e_r}{2}\right\rfloor$, $e_r \leq sz$, and

s represents a number of discrete multi-tone symbols in a frame, z represents a number of error correction symbols in a discrete multi-tone symbol, α represents a number of bits per code symbol, C+R represents a number of redundant symbols in an error correction field, n_{eff} represents a number of subchannels exceeding a threshold performance value, γ_{eff} represents an effective signal-to-noise ratio associated with the number of subchannels exceeding the threshold performance value, ε_s represents a target symbol error rate; and e_r represents a number of erasures; and

means for determining a number of bits per subchannel in accordance with the one or more values of K.

58. The apparatus of claim 57 wherein K is a continuous variable.

59. The apparatus of claim 57 wherein K is computed using dichotomy, for values of γ_{eff}, n_{eff}, z, and s.

60. The apparatus of claim 57 further comprising:

means for determining a net coding gain associated with values of γ_{eff}, n_{eff}, z, and s;

means for determining an incremental number of bits per subchannel associated with the net coding gain; and

means for storing associated values of γ_{eff}, n_{eff}, z, s and the incremental number of bits per subchannel.

61. An apparatus for selecting transmission parameters of a multicarrier system having a channel comprising a plurality of subchannels, comprising:

means for selecting a number (s) of discrete multi-tone symbols in a forward-error-correction frame, and a number (z) of forward-error-correction control symbols in a discrete multitone symbol based on a signal-to-noise ratio and a number of subchannels associated with the signal-to-noise ratio; and

means for transmitting information in accordance with the selected number (s) of discrete multi-tone symbols, and a number (z) of forward-error-correction control symbols in the discrete multitone symbol.

62. The apparatus of claim 61 wherein the means for selecting comprises:

selecting an adjustment value per subchannel based on the signal-to-noise ratio and the number of subchannels associated with the signal-to-noise ratio; and

means for adjusting a number of bits per subchannel for at least one subchannel in accordance with the adjustment value.

63. The apparatus of claim 61 wherein the signal-to-noise ratio is an average signal-to-noise ratio of the associated number of subchannels.

64. The apparatus of claim 61 further comprising:

means for storing, in a table, the number (s) of discrete multi-tone symbols in the forward-error-correction frame, the number (z) of forward-error-correction control symbols in the discrete multitone symbol associated with the signal-to-noise ratio and the number of subchannels associated with the signal-to-noise ratio, for different values of s, z, signal-to-noise ratios and numbers of subchannels.

65. The apparatus of claim 64 wherein for each value of signal-to-noise ratio and number of bits per subchannel of the table, the associated value of s and z provides a maximal net coding gain, and the associated value of s and z is selected from a subset of associated s and z values.